

## Metallurgical studies show EPICOR liners have lifetime exceeding 300 years

**E**PICOR liners used in the clean up of water from the Three Mile Island accident are in good condition, say EG&G Idaho officials in the EPICOR-II Research and Disposition Program. Metallurgical studies conducted by a team of EG&G Idaho engineers, representing several technical disciplines, found that liners have sustained minimal internal corrosion from their radioactive contents.

The liners began arriving at the INEL in 1982, transported from TMI via truck. The last liner (there are 50 in all) is scheduled to arrive later this month.

The metallurgical investigation was conducted to determine how long liners would last in storage. Results of the investigation show the liners will last well beyond their planned two year stay at the INEL. The liners are being stored in the TAN Hot Shop, says John McConnell, manager of EPICOR-II Research.

"The results from the testing have shown, with

an appropriate overpack (High Integrity Container), the liners are expected to have a 300 year lifetime," explains McConnell. "Two years is the maximum length of time they'll be stored at the site. We're providing an interim storage area for the liners until they are shipped to a commercial disposal site in Washington," he says.

"The tests also showed the corrosion on the inner side of the liners was so minute it couldn't be measured. Although the paint on the inside of some liners was degraded and peeling, the metal underneath was only slightly corroded."

According to McConnell, in order to examine liners, the contents of each were transferred to new uncontaminated liners. Following transfer operations, samples of painted steel were collected from the uncontaminated liner walls.

"We were working with an unusual mixture of ion-exchange materials that no one else has ever tried to move," explains McConnell. "We were able to transfer the materials quite nicely

although there were some initial problems. We used a high vacuum transfer system designed by Daryl Lopez, EG&G Idaho Engineering."

After transferring the resins to another container, the liners were decontaminated (remotely) so that visual inspections of liners could be performed. Test engineer Joe Stoyack, EG&G Idaho TMI-2 Technical Support, located areas from which samples needed to be taken. The metallurgical samples were then removed from the liner hands-on. The metal samples were transferred from TAN to ARA and TRA where the metallurgy was performed.

Howard Spaletta, EG&G Idaho Materials Technology, directed the metallurgical evaluation which, McConnell notes, involved some very difficult processes, including mounting and polishing of the metallurgical samples. Del Miley and Maurice Lindstrom, EG&G Idaho Materials Technology, who performed part of this work, were able to develop a number of specimens that retained the paint and corrosion product still adhering to the metal. Stoyack was able to process several highly radioactive specimens remotely at the TRA Hot Cells. These also retained the corrosion product. "We weren't sure this could be done because it is a very difficult process," says McConnell.

The EPICOR-II Research and Disposition Program will be conducting several more projects in conjunction with the resins. It will ascertain the damage to resins caused by large doses of radiation from internal sources; it will study the solidification of high radionuclide loading in resins; and it will conduct field tests of solidified samples in which immobilized resin samples will be contained in open drums (lysimeters) and buried in the ground at four national labs across the country. The field study with lysimeters will measure environmental effects of leaching radionuclides from solidified samples. Those projects will be conducted over the next several years.



TAN HOT CELL mechanics cut a metallurgical sample from the wall of an EPICOR-II liner as part of TMI-2 research to determine the integrity of the 50 liners being placed in interim storage at the INEL.



A TAN HP technician performs a radiation survey on the metallurgical sample removed from an EPICOR-II liner while mechanics clean up after the removal effort. The two discs in the foreground are typical samples which were removed from a liner.